ORIGINAL ARTICLE

LDH Levels in Pregnancy and its Association with Severity of the Disease and Feto-maternal Outcome in Pre-eclampsia and Eclampsia

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Abstract

The aim of present study was to correlate LDH levels in pregnant women and women with Preeclampsia and eclampsia in antepartum period and to study the correlation of maternal and perinatal outcome with LDH levels. Pregnant women in this study were enrolled in 3rd. trimester from 28 weeks onwards . Case control study was done in 100 women with normal B.P and in another 100 women having Pre-eclampsia and Eclampsia . Serum LDH level was measured using commercially available kits. Serum levels of LDH were significantly increased in women with Pre-eclampsia and eclampsia as compared to control group A significant positive correlation was found in patients with Pre-eclampsia and Eclampsia . LDH levels gradually increased with increase in the severity of the disease .. Regular monitoring of serum LDH levels in women with Pre-ecalmpsia and Eclampsia may help in detecting severity of the disease and associated end organ damage.

Key Words

LDH, Pre-eclampsia, Eclampsia

Introduction

Pregnancy is a physiological state associated with many alteration in metabolic, biochemical , physiological , hematological and immunological processes. If there are no complications, all these changes are reversible following a few days to few months after delivery (1). Maternal mortality remains very high in developing countries including India. Maternal mortality ratio in India is 200 / lakh live births. Maternal medical condition like Pre-eclampsia , Eclampsia and APH, all have increased maternal mortality rate (2). Globally an estimated 287,000 women died during pregnancy and child birth in 2010 of which India accounted for approximately 19% (56,000) deaths (3). Hypertensive disorder of pregnancy occurs in approximately 6-8 % of all pregnancies (4). It accounts for approximately a quarter of all antenatal admissions (5). In addition as it is, strongly associated with foetal growth retardation and prematurity, it also contributes largely to perinatal mortality and morbidity (6).

Hypertensive disorders of pregnancy represent a group of conditions with high B.P during pregnancy, proteinuria and in some cases convulsions. The most serious consequences for the mother and the baby are the result of pre-eclampsia and eclampsia (7-9). Pre-eclampsia and Eclampsia become apparent in late stages of pregnancy , usually in third trimester. These are multisystem disorders which affect renal, hepatic, nervous and coagulation system of body, thus leading to cellular death and significantly raised LDH levels .

Pre -eclampsia is still regarded as disease of theories and its etiology has been poorly understood . It is a disorder of widespread vascular endothelial function and vasospam that occurs after 20 weeks of gestation and can present

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as late as 4-6 weeks post partum. The analysis of biochemical markers particularly markers related to vascular dysfunction such as LDH, AST, uric acid may enrich the ability to predict and prevent Pre-eclampsia in near future (10,11). LDH is an intracellular, enzyme found in almost all body tissues. Normal LDH levels vary from 200 - 400 I.U./L. Pregnancy itself does not affect the LDH levels. When tissues are damaged by injury or disease , there is increase in the level of LDH in blood (12) .

Material and Methods

This study was conducted on 200 anti-natal women attending the Deptt. of Obst and Gynae., SMGS Hospital, Govt. Medical College, Jammu. Pregnant women were enrolled in this study in third trimester of pregnancy from 28 weeks onwards.Detailed history was taken and thorough clinical examination was done. Patients were divided into healthy normotensive patients and patients of Pre-eclampsia and Eclampsia. Those with high blood pressure were further divided into, mild Pre-Eclampsia, severe Pre-eclampsia and Eclampsia. Patients with hypertension less than 20 weeks, renal diseases, diabetes, liver disorders, epilepsy, haemolytic anaemia, trauma, bone fractures , muscle injury and on drugs (aspirin, fluoride, narcotics) were excluded from this study. Apart from routine haematological tests, special investigations like LDH, platelet count, doppler. and funduscopy was done. The participants were followed in OPD and in wards till delivery. This study was approved by Institutional ethical committee. At serum LDH levels > 800 IU/ L, Patients had maternal complications like primary PPH, vaginal wall haematoma, intra cranial haemorrhage and pulmonary oedema.

Results

Maximum number of patients in both the groups were nulliparas and were in the age group of 21-25 years (*Table 1 & 2*) Maximum number of patients in group - 1

Table I. Age Distribution of The Study Subject

Age (Years)	Group 1 (Control)		Group 2 (PTH)		P – value
	No.(100)	%	No.(100)	%	
< 20	6	6.00	5	5.00	
21 – 25	58	58.00	45	45.00	
26 – 30	30	30.00	41	41.00	**0.123**
> 30	6	6.00	9	9.00	
Mean ± SD	**25.17 ± 3.44**		**25.75 ± 3.40**		
(Min - Max.)	**(19-37)**		**(20-35)**		

Table 2. Distribution of the Patients According to Parity

Parity	Group 1 no.	% age	Group 2 No.	% age	P – value
P0	71	71.00	74	74.00	
P1	21	21.00	21	21.00	
P2	7	7.00	5	5.00	0.707
≥ P3	1	1.00	0	0.00	
Total	100	100	100	100	

Table 3. Distribution of The Patients According To Mode of Onset of Labour

MODE	Group 1 no.	% age	Group 2 no	% age	P – Value
Spontaneous	55	55.00	23	23.00	
Induced	30	30.00	48	48.00	
LSCS	15	15.00	29	29.00	< 0.001
Total	100	100	100	100	

Table 4. Association of BP With LDH Levels in Various Groups

Group-Name	No.	(Min ; Max.)	Mean	SD	R – Ratio	P – Value
			LDH I.U./L			
Controls BP< 140/90mmHg.	100	(110;245)	179.10	23.13	411.694	<0.001
Mild Preeclampsia BP 140/90 - <160/110 mmHg.	33	(210;762)	394.23	119.23		
Severe Preeclampsia =160/110 mmHg.	35	(500;1100)	740.60	142.24		
Eclampsia	32	(566;1641)	840.38	196.50		

Table 5. Association of Maternal Antepartum and Postpartum Complications With LDH Levels

Ante Partum Complication	LDH< 600 I.U./L No.= 136 (%)	LDH 600-800 I.U./L No.= 35 (%)	LDH>800I.U./L No.= 29 (%)
Impending eclampsia	1 (0.7%)	2 (5.8%)	1 (3.4%)
Abruption	0 (0%)	2 (5.8%)	2 (6.9%)
HELLP syndrome	0 (0%)	0 (0%)	2 (6.9%)
POST PARTUM COMPLICATION			
Primary PPH	0 (0%)	1 (2.8%)	3 (10.4%)
Vaginal wall haematoma	0 (0%)	1 (2.8%)	2 (6.9%)
Vulval haematoma	0 (0%)	1 (2.8%)	0 (0%)
Post caesarean abdominal wall haematoma	0 (0%)	0 (0%)	2 (6.9%)
Intracranial haemorrhage	0 (0%)	0 (0%)	1 (3.4%)
Pulmonary oedema	0 (0%)	0 (0%)	1 (3.45)

Table 6. Association of Total Maternal Complications With LDH Levels

	< 600 I.U./L No. (%)	(600-800) I.U./L No. (%)	>800 I.U./L No. (%)	P – Value
Uncomplicated	135(99.3%)	28(80%)	15(51.8%)	< 0.001
Complicated	1(0.7%)	7(20%)	14(48.2%)	

had spontaneous onset of labour while as in patients with preeclampsia and eclampsia induction of labour was done *(Table-3*) . The above table shows that High B.P was associated with higher level of serum LDH (P<0.01) (Table-4) On statistical analysis the difference among the three groups was highly significant (*Table- 5 & 6*) Similarly Neonatal outcome was observed in relation to LDH levels . With LDH levels > 800 IU/L, mean birth weight was 1.90 .4678 kg and mean Apgar score was 7.21 3.73. Mean gestational age was 34.9 2.1 weeks.

Foetal complications like IUGR was more i.e 8.0 (24.1%) and IUD (17.3%). Neonatal complication in relation to LDH level (i.e LDH >800IU/L), 10.4% had RDS, 3.4% had meconium aspiration syndrome and 3.4% had Hypoxic Ischaemic encephalopathy. Perinatal complication, even perinatal death was there with LDH level >800 IU/L.

Discussion :

Hypertensive disorders of pregnancy are known since ancient times (13). Many theories have suggested that endothelial dysfunction caused by factors released from ischaemic placenta, may be a causative factor for disease pathogenesis (14). LDH enzyme plays an important role in cellular respiration, the process by which glucose from food is converted into usable energy for cells.Elevated levels of LDH indicate tissue damage and is the main cause of occurrence of Preeclampsia, abruption, Intracranial Haemorrhage, HELLP Syndrome, acute

renal failure, DIC and Pulmonary oedma as compared to control group (15). In this study increased level of LDH was found in patients with preeclampsia and Eclampsia as compared to control group. Qublan et all also found in their study that mean LDH levels in normal control was 299+79 IU/L and in PIH and Severe Preclampsia, it was more than 400 IU/L - Up to 800 I/U/L (16). Higher levels of serum LDH are very useful markers to identify the occurrence of implication of Preeclampsia and may reduce the risk of occurance of disease (17). Maternal complications like impending eclampsia was observed with LDH level of >600IU/L(5.8%), Obruptio (2.8) ,preterm labour and PPH 2.8% and vaginal Hematoma 2.8% . Martin *et al* (1999) also found higher level of LDH associated with significant maternal mortality and morbidity (18).

Present study also showed that there is reduction in birth rate and reduced Apgar score with raised LDH levels. It was also found that mean gestational age decreases with increased LDH levels. This was mainly due to induction of labour at an earlier gestational age in patients with increased LDH levels. Gupta JSP, (17) also found that mean gestational age was significantly less in patients with raised LDH levels (17). In our study with LDH level (600 - 800 IU) neonates had IUGR in antinatal period. 2.8% had Doppler changes . 2.8% had septicaemia and 11.4% had IUD. Thus there is an increase in perinatal complication and even perinatal death with increased LDH levels. Malerewicz *et al* (2006), also concluded that acute clinical symptoms that endanger fetal life in Preeclampsia correlate well with distinct activity of LDH (19).

Conclusion

Regular estimation of LDH is advisable for pregnancy diagnosed with hypertension in order to detect and prevent morbidity and mortality in mother as well as in foetus.

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